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uniformly spaced for measuring an amount of radiant energy in the imagable electromagnetic radiation signal wherein each of the detector elements [produce images] produces an image having a different [phases] phase of the same scanned surface based on the measurement;

means for maintaining the at least one projector and the detector in a substantially fixed relation to each other; and

means for computing phase values and amplitude values for the different phases from the images.

REMARKS

In the August 13, 1996 Office Action the Examiner objected to the drawings. The Examiner also rejected claims 1-27 under 35 U.S.C. §103 as being unpatentable over the U.S. Patent to Kuchel, 5,135,308, in view of the U.S. Patent to Bullock et al. 5,488,478.

With respect to the drawing objection, the Examiner's attention is directed to page 9, lines 4-13 and the drawing figures, wherein it is clear that the object 14 moves in a direction 20 perpendicular to an optical axis of the lens 40 of the camera 24. Consequently, it can be seen how the object is moved in a direction substantially perpendicular to the detector and optical axes, as noted in claims 6 and 19.

With respect to the other drawing objection, the Examiner's attention is directed to element 42 of Fig. 2 and element 42" of Fig. 4. Elements 42 and 42" are projectors. The second projector 42 is described on page 15 of the specification and the second projector 42" is described on page 13.

Referring now to the rejection under 35 U.S.C. §103, it is initially noted that the U.S. Patent to Kuchel discloses a system where the camera and the object are stationary and the grating is moved. Movement of the grating pattern is essential

to Kuchel.

As admitted by the Examiner, "Kuchel does not teach the step of moving the object relative to at least one projector at the vision station to scan the projected pattern of electromagnetic radiation across a surface of the object." Rather, the Examiner states that the U.S. Patent to Bullock et al. discloses this feature.

However, from an examination of Bullock it is clear that Bullock discloses the use of scanners 22 to scan laser-generated light beams continuously across an object surface in a direction generally normal to the direction of movement of the object. This is contrary to the claimed teachings of the present invention wherein the object is moved relative to the at least one projector at the vision station so as to scan the projected pattern of electromagnetic energy across a surface of the object to generate an imageable electromagnetic radiation signal. In other words, only with the present invention are multiple scans coordinated with relative motion at a substantially constant velocity of the object to extract phase information from substantially uniformly spaced detector elements. Also, the present invention is limited in that the at least one projector is maintained in a substantially fixed relation to the detector.

As previously noted, the U.S. Patent to Kuchel requires that the camera and the object are stationary and its grating is moved. There is no teaching to modify Kuchel to maintain a camera and a grating in a substantially fixed relationship and to provide relative movement between these two fixed objects and an object. Such requirements would clearly destroy the teachings of Kuchel.

Bullock teaches that creating the proper geometry of laser lines with one or more linear array cameras allows the measurement of contours of a strip. Although the strip is

moving, a key feature of the Bullock invention is that one image from the line scan camera can capture the data needed to define the surface contour. In other words, if the laser scans synchronously across the strip, the measurement is instantaneous. (See Bullock at column 2, line 58). Consequently, Bullock is not affected by vibrations or changes in the rate of relative object motion.

This is quite different from the present invention, as claimed, wherein because multiple scans are coordinated with the substantially uniform motion of the object in order to extract phase information, vibrations and changes in the rate of motion will affect the measurement at the substantially uniformly spaced detector elements.

Consequently, in view of the above and in the absence of better art, Applicant's attorney respectfully submits that the application is in condition for allowance, which allowance is respectfully requested.

Respectfully submitted,

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